

AD-A256 903

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SECURITY CLASSIFICATION

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## REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

1a REPORT SECURITY CLASSIFICATION Unclassified		1b RESTRICTIVE MARKINGS Unclassified	
2a SECURITY CLASSIFICATION AUTHORITY Unclassified		3 DISTRIBUTION AVAILABILITY OF REPORT Unclassified	
2b DECLASSIFICATION/DOWNGRADING SCHEDULE Unclassified			
4 PERFORMING ORGANIZATION REPORT NUMBER(S)		5 MONITORING ORGANIZATION REPORT NUMBER <b>This document has been approved for public release and sale; its distribution is unlimited.</b>	
6a NAME OF PERFORMING ORGANIZATION Massachusetts Inst. of Tech Dept. of Earth, Atmos. & Planet. Sci.	6b OFFICE SYMBOL (if applicable) EAPS	7a NAME OF MONITORING ORGANIZATION	
6c ADDRESS (City, State, and ZIP Code) 77 Massachusetts Avenue E34-272 Cambridge, MA 02139		7b ADDRESS (City, State, and ZIP Code)	
8a NAME OF FUNDING/SPONSORING ORGANIZATION Office of Naval Research	8b OFFICE SYMBOL (if applicable) ONR	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N00014-90-J-1690	
8c ADDRESS (City, State, and ZIP Code) 800 North Quincy St. Arlington, VA 22217		10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO PROJECT NO TASK NO WORK UNIT ACCESSION NO	
11 TITLE (Include Security Classification) Oceanic Distribution of Trace Metals			
12 PERSONAL AUTHOR(S) Edmond, Jrhn M.			
13a TYPE OF REPORT Final Report	13b TIME COVERED FROM 1/1/90 TO 3/31/91	14 DATE OF REPORT (Year, Month, Day) October 5, 1992	15 PAGE COUNT 2
16 SUPPLEMENTARY NOTATION			
17 COSATI CODES FIELD GROUP SUB-GROUP		18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number) <b>DTIC ELECTE OCT 15 1992 A D</b>	
19 ABSTRACT (Continue on reverse if necessary and identify by block number)  see attached Final Report  99 1			
20 DISTRIBUTION AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21 ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a NAME OF RESPONSIBLE INDIVIDUAL Morris, Martin		22b TELEPHONE (Include Area Code) (617) 253-2581	22c OFFICE SYMBOL ONRRR

DD Form 1473, JUN 86

Previous editions are obsolete

S/N 0102-LF-014-6603

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## ONR Final Report

This is the final report on a series of ONR-funded projects that extended over 20 years at MIT. The general aim of the various projects was to elucidate the geochemical dynamics of dissolved trace elements in the oceanic water column. At the beginning of the project essentially nothing was known. Analytical methods and sampling protocols had to be developed to deal with concentration levels as low as 10-15 molar. Early work produced the first reliable data for Cu, Ni and Cd. Over the years methods were developed for Se, Be, Al, Bi, Te and Cr. The first direct measurements of chemical speciation were made, for the oxidation states of Se and Te. The first sea-going measurements were also made, for Se, Be and Al. In addition the earliest accurate profiles were obtained for the suspended material in the water column.

The final phase of this long-term project was directed at the Platinum Group Elements (PGE). Accurate water column profiles have been obtained for Au, Pt and Re and pore water and sediment data have been obtained for Pt, Re, Pd and Ir. These data demonstrate that, in the marine environment, the PGE do not behave as a coherent "group" but instead display very diverse chemical behaviour driven by their differing redox chemistries. The results of this work are in the process of publication.

Accession For	
NTIS CRASI	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
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Availability Codes	
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A-1	